Monitor lift for Adjustment of Computer Display &
Oil Paint Cap Removal Aid

Weekly 4 Report 1: 9.28.07 – 10.4.07
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Work completed

Paint Cap Remover:
We came up with the new design for the paint tube holder. The shape of the paint tube holder will be rectangle, and the material is Aluminum (Al). The initial design was that the tube holder has a V shape and the material is plastic. The down side for this design is that it is hard to attach the shaft of the motor if the tube holder is plastic. Al is light metal and easy to mount to the shaft of the motor. We went to the machine shop as a group and we gathered a block of Al. We milled out the part of the block to create a U shape tube holder. The images below are the picture of the block.

Image 1, 2 – The paint tube holder

The motor’s shaft will be inserted at the bottom of the tube holder as shown in the image 4 below. The screw lock mechanism will ensure the motor’s shaft will be locked and will not rotate during the power up of the motor (image 5). Therefore, we will drill a hole at the center of the tube holder bottom surface, and a second threaded hole on the side.

Image 3 – Motor’s shaft connecting to tube holder
Since the motor is not ready to be inserted in the tube holder, I wanted to know the torque to open the paint cap while the cap being clamped. It showed that I did not need to insert much force to twist open the paint cap, pictures below illustrated the testing process.

The current motor that we have has a torque power of 15lbh, which is more than enough to perform this procedure. The Al material is not heavy at all and it is very sturdy. This material will not be worn and can be used for a very long time.

**Monitor Lift:**
We figured out how to control the linear actuator using the polarity reverse momentary toggle switch (image 7). The switch characteristic is (ON)OFF(ON), meaning that it will stay off until the user push it to either direction. The switch will return to the off position once the user releases it. It is not complicated how to connect the wire to the switch.
I also designed a mechanism of locking the linear actuator to the bottom platform. We will use the surface mount clamp (image 9) to clamp down the motor part of the actuator. We might need more than 1 clamp to enhance a sturdy mount. We will build a motor’s base, which is the block of material that is placed underneath the actuator. The surface clamp will be mounted on this motor’s base. Because there is a small pole that is sticking out at the bottom of the actuator, we will drill a hole into this motor base. This hole will fit perfectly the actuator’s pole. There is a hole in this pole with a purpose of locking the actuator and preventing it from falling down. We will take this advantage to lock the actuator by using the screw locking mechanism. The screw will have the diameter that is as big as the pole’s hole diameter. By inserting this big screw, it will lock the actuator from falling down. The image 10 below illustrates how the system works.

**Image 9** – Surface mount clamp

**Image 10** – The locking mechanism of the actuator

This motor’s base will be mounted to the platform. The techniques can be either welding or screw in hinges. The materials of these parts will be discussed later this week.
Project Review
For the paint cap remover, we are almost done with the tube holder, we only need to attach the motor’s shaft to the tube holder. The circuitry is not too complicated to finish up within a short time frame.

For the monitor lift, Dr. Hallowel did not reply and we do not know whether she wants to get a new LCD monitor. Therefore, the project is very slow right now. However, it was great that we know how to control the linear actuator using the polarity reverse momentary toggle switch.

Future Work
Monitor Lift:
- Find out the materials for the motor’s base and platform
- Construct the motor’s base and platform

Paint Cap Remover:
- Build a locking mechanism for the tube holder
- Insert and test the functionality of the motor
- Improve the circuitry, which include fuse, switch, and other components

Total work hours: 12 hours